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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|------------------------------|---------------------|------------------|
| 10/518,826 | 12/21/2004 | Johan Christiaan Halberstadt | NL021249 | 3604 |
| 24737 | 7590 | 07/21/2006 | EXAMINER | |
| PHILIPS INTELLECTUAL PROPERTY & STANDARDS | | | | RILEY, SHAWN |
| P.O. BOX 3001 | | | | ART UNIT |
| BRIARCLIFF MANOR, NY 10510 | | | | PAPER NUMBER |
| | | | | 2838 |

DATE MAILED: 07/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/518,826 | HALBERSTADT ET AL. | |
| | Examiner | Art Unit | |
| | Shawn Riley | 2838 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-14 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-14 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on dec04 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 - 1) Certified copies of the priority documents have been received.
 - 2) Certified copies of the priority documents have been received in Application No. _____.
 - 3) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>dec04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawing(s) is(are) objected to because they fail to label (figure(s) 1,2, and 5-6) what the element boxes CO, OVM, COS, DR, DCO, INT, IVM are. Without some indication as to the content of the boxes (or preferably ansi symbols of the actual elements) it is not clear as to what the elements are and they are not explanatory to a reader as a quick method of determining the general background of the invention.

See MPEP 608.02 and 37 CFR 1.84 (o) -- **Legends**

Suitable descriptive legends may be used, or may be required by the Examiner, where necessary for understanding of the drawing, subject to approval by the Office. They should contain as few words as possible.

Specification

2. The disclosure is objected to because of the following informalities: The specification is missing titles such as Background of the invention, summary of the invention, brief description of the drawings, etc. Appropriate correction is required.

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. E.g., DC Regulator with Pulse Period Modulation.

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-14 are rejected under 35 U.S.C. §102(b) as being fully anticipated by Schwartz et al. (U.S. Patent 5,808,455). Schwartz et al. shows,¹ (in, e.g., the(ir) figures 4-5c and corresponding disclosure)

As to claim 1. A DC-DC converter comprising: an inductor (L) coupled for receiving a DC-input voltage (V_{IN}) and for supplying an output voltage (V_{OUT}), a switch (M1) for periodically connecting the inductor to the DC-input voltage during an on-period of a period time, an

¹ Note claims will be addressed individually and the material in parentheses are the examiner's annotated comments. Further unless needed for clarity reasons, recited limitation(s), will be annotated only upon their first occurrence. Annotated claims begin with the phrase "As to claim". Claims that are not annotated are seen as having already had the invention(s) addressed previously in an annotated claim and may be repeated for convenience of the applicant/examiner. Bolded words/phrases indicate rejected material based 112 paragraph rejections. Underlined words/phrases indicate objected to material. For method claims, note that under MPEP 2112.02, the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). Therefore the previous rejections based on the apparatus will not be repeated.

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operating frequency of the DC-DC converter being the inverse of the period time (pulse period modulation, see, e.g., claim 10), and a controller (100) for controlling the operating frequency to be substantially proportional to the output voltage to obtain a substantially constant average duration of the on-period as function of the output voltage (see, e.g., column 7 lines 18).

As to claim 2. A DC-DC converter as claimed in claim 1, wherein the controller comprises: a drive circuit (output of, e.g., 106) for supplying a drive signal to the switch to control on- and off-states of the switch, a controllable oscillator (the output of the oscillator is controlled making it a controllable oscillator through the attached circuitry) for supplying a control signal to the drive circuit, and an output voltage measurement circuit (including U2/U3/U5) for supplying an oscillator control signal for controlling the controllable oscillator to adapt its operating frequency to be substantially proportional to the output voltage while keeping the average duration of the on-period of the switch substantially constant.

As to claim 3. A DC-DC converter as claimed in claim 1, wherein the operating frequency is substantially directly proportional to the output voltage (by definition, wherein the circuitry utilizes feedback).

As to claim 4. A DC-DC converter as claimed in claim 1, wherein the operating frequency is further dependent on the DC-input voltage to obtain the substantially constant average duration of the on-period as function of the DC-input voltage, also (the circuitry also has feed-forward at node 16).

As to claim 5. A DC-DC converter as claimed in claim 4, wherein the operating frequency is substantially directly inverse proportional to the DC-input voltage (by definition, this is how a feedback responsive ppm works).

As to claim 6. A DC-DC converter as claimed in claim 5, wherein the operating frequency f_o is $f_o = (N \cdot \text{times} \cdot V_o) / (T_{on} \cdot \text{times} \cdot V_i)$, wherein N is a constant, V_o is the output voltage, T_{on} is the substantially constant average duration of the on-period, and V_i is the DC-input voltage (see, rejection of claim 5).

As to claim 7. A DC-DC converter as claimed in claim 1, wherein the controller comprises a comparator (U_2/U_3 's negative input verses the positive input to U_2/U_3) for comparing an actual duration of the on-period of the switch with a desired duration of the on-period to control the operating frequency to obtain the substantially constant average duration of the on-period (based on filtering means of L/C).

As to claim 8. A DC-DC converter as claimed in claim 7, wherein the controller further comprises: a loop filter (L/C) for filtering a difference signal supplied by the comparator to obtain a filtered difference signal, a controllable oscillator for receiving the DC-input voltage (16 node), the output voltage, and the filtered difference signal to supply an oscillator signal having the operating frequency and the substantially constant average duration of the on-period, and a drive circuit for receiving the oscillator signal to drive the switch.

As to claim 9. A DC-DC converter as claimed in claim 7, wherein the controller further comprises: an input voltage measurement circuit for measuring a value of the DC-input voltage (104), an output voltage measurement circuit for measuring a value of the output voltage, a loop filter for filtering a difference signal supplied by the comparator to obtain a filtered difference signal, a controllable oscillator for receiving the value of the DC-input voltage, the value of the output voltage, and the filtered difference signal to supply an oscillator signal having the operating frequency and the substantially constant average duration of the on-period, and a drive circuit for receiving the oscillator signal to drive the switch.

10. A DC-DC converter as claimed in claim 7, wherein the operating frequency f_o is $f_o = (N \cdot \text{times} \cdot V_o) / (T_{on} \cdot \text{times} \cdot V_i)$, wherein V_o is the output voltage, T_{on} is the substantially constant average duration of the on-period, V_i is the DC-input voltage, and wherein N depends on the filtered difference signal.

As to claim 11. A DC-DC converter as claimed in claim 1, wherein a series arrangement of main current paths of the first mentioned switch and a further switch is arranged for receiving the DC-input voltage, the inductor being arranged between a smoothing capacitor and a junction of the main current paths of the first mentioned switch and the further switch (M2), the output voltage being present across the smoothing capacitor, the control circuit being adapted to further control the further switch in substantially the opposite phase than the first mentioned switch.

12. A controller for use in the DC-DC converter as claimed in claim 1.
13. An apparatus comprising a DC-DC converter as claimed in claim 1.

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14. A method of controlling a DC-DC converter comprising: an inductor coupled for receiving a DC-input voltage and for supplying an output voltage, a switch for periodically connecting the inductor to the DC-input voltage during an on-period of a period time, an operating frequency of the DC-DC converter being the inverse of the period time, the method comprising the step of controlling the operating frequency to be substantially proportional to the output voltage to obtain a substantially constant average duration of the on-period as function of the output voltage.

Allowable Subject Matter

3. No claims are allowable over the prior art of record.

Conclusion

Any inquiry from other than the applicant/attorney of record concerning this communication or earlier communications from the Examiner should be directed to the Patent Electronic Business Center (EBC) at 1.866.217.9197. Any inquiry from a member of the press concerning this communication or earlier communications from the Examiner or the application should be directed to the Office of Public Affairs at 703.305.8341. Any inquiry from the applicant or an attorney of record concerning this communication or earlier communications from the Examiner should be directed to Examiner Riley whose telephone number is 571.272.2083. The Examiner can normally be reached Monday through Thursday from 7:30-6:00 p.m. Eastern Standard Time. The Examiner's Supervisor is Karl Easthom who can be reached at 571.272.1989. Any inquiry about a case's location, retrieval of a case, or receipt of an amendment into a case or information regarding sent correspondence to a case should be directed to 2800's Customer Service Center at 571.272.2815. Any papers to be sent by fax MUST BE sent to fax number 571-273-8300. Any inquiry of a general nature of this application should be directed to the Group receptionist whose telephone number is 571.272.2800. Status information of cases may be found at <http://pair-direct.uspto.gov> wherein unpublished application information is found through private PAIR and published application information is found through public PAIR. Further help on using the PAIR system is available at 1.866.217.9197 (Electronic Business Center).

July 2006



Shawn Riley
Primary Examiner